WHAT IS CLAIMED IS:

1. A semiconductor structure comprising a non-single-crystal semiconductor film including a channel region for an active device, and a support substrate that supports the non-single-crystal semiconductor film, the channel region having an oxygen concentration not higher than $1 \times 10^{18}$ atoms/$cm^3$ and a carbon concentration not higher than $1 \times 10^{18}$ atoms/$cm^3$.

2. The semiconductor structure according to claim 1, wherein each of the oxygen concentration and the carbon concentration is not higher than $5 \times 10^{17}$ atoms/$cm^3$.

3. The semiconductor structure according to claim 1, wherein the channel region includes a metal element with a concentration not higher than $1 \times 10^{17}$ atoms/$cm^3$.

4. The semiconductor structure according to claim 3, wherein the concentration of the metal element is not higher than $5 \times 10^{16}$ atoms/$cm^3$.

5. A manufacturing method for a semiconductor structure having a non-single-crystal semiconductor film including a channel region for an active device, and a support substrate that supports the non-single-crystal semiconductor film, the method comprising subjecting an inner wall of a film-forming chamber to a surface etching process with a fluorine-based gas, coating the inner wall with an amorphous semiconductor

film with a thickness of 50 to 1000 nm, placing the support substrate in the film-forming chamber and forming the non-single-crystal semiconductor film, and melting and recrystallizing the non-single-crystal semiconductor film by heating.

6. The manufacturing method according to claim 5, further comprising subjecting the inner wall to a baking process in a temperature range of 80 to 150℃.

7. The manufacturing method according to claim 5, wherein energy light is radiated to heat the non-single-crystal semiconductor film.

8. The manufacturing method according to claim 5, wherein the non-single-crystal semiconductor film is heated for a heating time of 10 seconds or less at a heating place.

9. The manufacturing method according to claim 7, wherein the heating time is one second or less.

10. A manufacturing apparatus for a semiconductor structure having a non-single-crystal semiconductor film including a channel region for an active device, and a support substrate that supports the non-single-crystal semiconductor film, the apparatus comprising a film-forming unit that accommodates the support substrate in a film-forming chamber and forms the non-single-crystal semiconductor film, and a crystallizing unit that melts and recrystallizes the non-single-crystal semiconductor film, the film-forming chamber

having an inner wall formed of a metal containing aluminum.

11. The manufacturing apparatus according to claim 10, wherein a surface of the inner wall includes fluorine atoms and is coated with an amorphous semiconductor film with a thickness of 50 to 1000 nm.

12. A semiconductor device comprising a non-single-crystal semiconductor film, a support substrate that supports the non-single-crystal semiconductor film, and an active device having a part of the non-single-crystal semiconductor film as a channel region, the channel region having an oxygen concentration not higher than $1 \times 10^{18}$ atoms/cm$^3$ and a carbon concentration not higher than $1 \times 10^{18}$ atoms/cm$^3$.

13. The semiconductor device according to claim 12, wherein the active device is a thin-film transistor including source and drain regions disposed on both sides of the channel region in the non-single-crystal semiconductor film, and a gate electrode layer insulated from the channel region by an insulation film.

14. The semiconductor device according to claim 13, wherein the channel region is located within a single crystal grain that has a growth direction coinciding with a direction of arrangement of the source and drain regions.

15. The semiconductor device according to

claim 12, wherein each of the oxygen concentration and the carbon concentration is not higher than $5 \times 10^{17}$ atoms/$cm^3$.

16. The semiconductor device according to claim 12, wherein the non-single-crystal semiconductor film includes a metal element with a concentration not higher than $1 \times 10^{17}$ atoms/$cm^3$.

17. The semiconductor device according to claim 16, wherein the concentration of the metal element is not higher than $5 \times 10^{16}$ atoms/$cm^3$.

18. A semiconductor device comprising a non-single-crystal semiconductor film, a support substrate that supports the non-single-crystal semiconductor film, and an active device having a part of the non-single-crystal semiconductor film as a channel region, the channel region having an oxygen concentration not higher than $1 \times 10^{18}$ atoms/$cm^3$ and a stacking fault density not higher than $1 \times 10^6$ $cm^{-3}$.

19. A manufacturing method for a semiconductor device having a non-single-crystal semiconductor film, a support substrate that supports the non-single-crystal semiconductor film, and an active device having a part of the non-single-crystal semiconductor film as a channel region, the method comprising subjecting an inner wall of a film-forming chamber to a surface etching process with a fluorine-based gas, coating the inner wall with an amorphous semiconductor film with a

thickness of 50 to 1000 nm, placing the support substrate in the film-forming chamber and forming the non-single-crystal semiconductor film, and melting and recrystallizing the non-single-crystal semiconductor film, thus forming the active device having the part of the non-single-crystal semiconductor film as the channel region.